The American FERTILIZER

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The American FERTILIZER

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Fertilizer Progress in Bizonal Germany

By K. D. JACOB* and RALPH W. CUMMINGS**

(Continued from the issues of April 2 and April 16, 1949)

Superphosphate. It is reported that prior to the war the Bizone had 19 superphosphate plants with an estimated total capacity of 124,380 tons of P_2O_5 annually (*43, 44*). Eight of the plants had coexisting facilities for manufacture of sulfuric acid. All the plants produced only ordinary superphosphate containing an average of 17.5 per cent water-soluble P_2O_5. Concentrated superphosphate (double or triple superphosphate) has not been made in Germany for many years, and the present program includes no facilities for this material. The superphosphate industry in the British portion of the Bizone is discussed by Maclennan, Angus, and Corbett (*57*).

Two superphosphate plants, located respectively at Harburg and Köln-Kalk, were destroyed during the war. A third plant, a very small one located at Griesheim, Hessen, probably discontinued operation before the war. As its fate is not known to the writers it is not included among the present facilities (Table VI). The other 16 plants, most of which suffered comparatively little war damage are currently in production. Rehabilitation of the heavily damaged plant of Chemische Werke Albert was expected to be completed about July, 1948. The Köln-Kalk plant has been rebuilt and was expected to resume operation in June, 1948. As this plant will produce only ammoniated superphosphate for processing into compound fertilizers, it is presently listed with the facilities for making compound fertilizers (Tables II and VI). At present there is no plan for rebuilding the sulfuric acid plant that formerly existed at this location. It is reported that reconstruction of the Harburg plant is planned for completion by 1951. As formerly, this plant will use purchased sulfuric acid. Süd-Chemie A. G. has plans for a new superphosphate plant at Kelheim, expected to be in operation in 1951. Sulfuric acid will be supplied by the company's present plant at Kelheim.

Because of lack of phosphate rock, all the superphosphate plants were idle, or nearly so, during most of the war, with consequent heavy deterioration of machinery and equipment that in many cases was already antiquated and inefficient. Much progress has been made in rehabilitating the facilities but there continues to be great need for building materials and all kinds of replacement, repair, and maintenance items. Shortage of sulfuric acid is now handicapping superphosphate production and the situation may become more serious. Several investigations of sulfuric acid manufacture in Germany have been reported (*14, 30, 33, 57, 63, 68, 79*).

Basic Slag. Prior to the war, over 60 per cent of the phosphate fertilizer (basis 100% P_2O_5) used in the Bizone consisted of basic slag from the domestic steel industry. Also,

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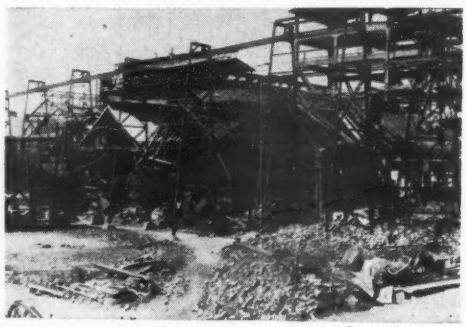
additional large quantities of slag were shipped to other parts of Germany. As previously pointed out the great curtailment of steel production has reduced the output of slag to only a fraction of its former level. Furthermore, the present Level of Industry Plan will continue to restrict sharply the production of steel and, correspondingly, of slag. The Bizone has 12 plants for production of basic slag, all but three of which are located in the Ruhr (Table VI). Eleven of these plants were in operation in the first week of March, 1948, and the output in that week was at the rate of 60,000 tons of P_2O_5 per year. Elemental phosphorus is reported to have been produced experimentally from basic slag at Piesteritz during the war (*43, 47*).

The P_2O_5 content of basic slag is derived mostly from the phosphorus in the iron ore, especially the high-phosphorus ores normally imported from Sweden. Some mineral phosphate—phosphate rock or apatite—is usually added to the furnace burden to increase the phosphorus content of the pig iron and, correspondingly, of the basic slag. Before the war about 5 per cent of the P_2O_5 in German slag was derived from mineral phosphate.

Rhenania-Type Phosphate. The term "Rhenania-type phosphate" is applied to the products obtained by heating phosphate rock with alkali salts at high temperatures. One product of this kind, commonly called Rhenania phosphate, is made by heating the rock with soda ash (*21, 22, 60, 61*). The other, referred to as Röchling phosphate, is prepared by heating phosphate rock with soda slag obtained in the desulfurization of pig iron by the soda process(*29, 56a*). In both products the P_2O_5 is practically insoluble in water but is mostly soluble in neutral ammonium citrate solution. They are good sources of P_2O_5 for plant growth, and in this respect they appear to be generally equal to superphosphate. A process for producing a phosphate fertilizer (Lübeck phosphate) by sintering a mixture of phosphate rock, sodium sulfate, and lignite was developed in the Bizone before the war but was not put into commercial operation (*28*).

The Bizone has two plants for manufacture of Rhenania phosphate, the one at Brunsbüttelkoog and the other at Schwan-Dachelhofen (Table VI). The Brunsbüttelkoog plant, which is discussed in several reports by American and British investigators (*26, 27, 43, 53, 65*), commenced operation in 1917. It received no damage during the war, and it has been maintained in generally good repair. The plant has a present capacity of 22,000 tons of P_2O_5 annually, which can be increased to 25,000 tons by use of higher-grade phosphate rock. Production in March, 1948 was at the rate of 18,500 tons of P_2O_5 per year. Manufacture of Rhenania phosphate was commenced at Schwandorf-Dachelhofen in January, 1948. This plant, also undamaged during the war, was originally built for production of alumina. Its partial conversion to phosphate production was expected to be completed in the summer of 1948, with a capacity of about 29,000 tons of P_2O_5 annually. Production in March, 1948 was at the rate of 6,000 tons of P_2O_5 per year. Capacity operation of the two Rhenania phosphate plants would require about 50,000 tons of soda ash annually. Because of the large shortage of soda ash (*16, 69*) in the Bizone, production of Rhenania phosphate may fall considerably short of the total plant capacity for some time to come.



Superphosphate Plant. Chemische Werke Albert, Wiesbaden-Biebrich, Hessen. April, 1948

The Röchling phosphate plant at Mannheim-Rheinau (Table VI) was expected to commence operation in July, 1948, with a planned annual capacity of 60,000 tons of product containing 20 per cent of available P_2O_5. It is doubtful, however, that capacity production will be achieved in the near future, owing to the inferior quality of the present supply of soda slag and to lack of experience in large-scale operation of the process. Use will first be made of an old stock (about 60,000 tons) of soda slag available in the Ruhr. When this is exhausted the supply of slag will have to be obtained elsewhere, perhaps from the Saar, as the soda process for desulfurization of pig iron is said to have been discontinued in the Ruhr.

Compound Fertilizers. The term "compound fertilizer," as used in this paper, refers to products containing two or more of the major plant foods (N, P_2O_5, and K_2O), in which the individual particles are chemically homogeneous. The present program for phosphate fertilizer production in the Bizone includes two such products—Nitrophoska and the Kamp fertilizer (Table VI)—both of which have already been discussed in the section dealing with ammonia fixation. Compound fertilizers of the Nitrophoska type are made by processes involving treatment of phosphate rock with nitric acid (*9*, *58*, *64*). As these processes afford a means for the utilization of synthetic ammonia in the production of fertilizers containing nitrogen and phosphate, without the use of other chemicals such as sulfuric acid or soda ash to render the P_2O_5 available, consideration should be given to their use in the Bizone on a much larger scale than is presently planned.

Ground Raw Phosphate Rock. There is some demand for ground raw phosphate rock for direct application to the soil. About 8,000 tons of P_2O_5 in this form were used in 1947-1948. The quantity will probably be somewhat larger in subsequent years, especially when the present restriction on application of phosphate to grassland is lifted. In March, 1948, three plants, all in the northern part of the Bizone, produced ground raw phosphate rock at the rate of 10,080 tons of P_2O_5 per year. Two of the plants (Nordenham and Rendsburg) also produce superphosphate (Table VI), but the third plant (Lunen) does not make chemically processed phosphate fertilizers.

Potash

Prior to the war, Germany produced more than 60 per cent of the world supply of potash. The German mines provided the entire domestic consumption of potash (approximately 1,000,000 tons of K_2O annually in the Old Reich) and furnished an additional 350,000 to 400,000 tons per year for export (*43*, *44*). According to Mumford, *et al.* (*66*) this potash was produced by 31 mines, of which 17 were in the Soviet Zone and one in the French Zone. The production in the Bizone (556,000 tons of K_2O in 1938) was only slightly larger than the consumption in that area (529,200 tons in the year ended June 30, 1939), but in the French Zone the consumption was somewhat greater than the production. In the Soviet Zone, however, the production far exceeded the consumption, so that the net exportable surplus of potash came almost entirely from that area. Several postwar investigations of the German potash industry have been reported (*18*, *52*, *66*, *75*, *89*).

Nine principal plants and one small plant, all of which were in operation in 1938, produced potash in the Bizone in 1947–1948, and four additional plants, not operating in 1938, are scheduled to commence production in 1948–1949 to 1950–1951 (Table VIII). None of the mines and refineries, with the possible exception of Riedel Hanigsen (sister shaft to Niedersachsen) which served for munition storage, suffered serious war damage, but most of them are in need of much replacement and repair of equipment. Among the 14 facilities programmed for operation by 1950–1951, three (Mariaglück, Hohenfels, and Glückauf–Sarstedt) will produce only crude potash, principally kainite, chiefly for local sale. In the first week of March, 1948 the nine principal plants produced at the rate of nearly 467,000 tons of K_2O per year. No output was reported for Mariaglück which is actually a rock-salt mine with potash as a side line.

Among the three major plant foods, potash is the only one upon which no restrictions are placed by the Level of Industry

TABLE VIII. POTASH FERTILIZER FACILITIES IN THE BIZONE[1]

Mine	Location
Hattorf	Philippsthal, Hessen
Wintershall	Heringen, Hessen
Salzdetfurth	Bad Salzdetfurth, Hannover Provinz
Hansa	Empelde bei Hannover, Hannover Provinz
Siegfried-Giesen	Grossgiesen bei Hildesheim, Hannover Provinz
Bergmannssegen[2]	Lehrte, Hannover Provinz
Friedrichshall[2]	Sehnde bei Hannover, Hannover Provinz
Niedersachsen	Wathlingen, Hannover Provinz
Ronnenberg	Ronnenberg bei Hannover, Hannover Provinz
Mariaglück	.....
Glückauf-Sarstedt[3,4]	Sarstedt, Hannover Provinz
Hohenfels[3,5]	.....
Königshall[3,4]	.....
Sigmundshall[3,6]	Near Hannover, Hannover Provinz

[1]Listed in descending order of reported production of K_2O in calendar year 1938.
[2]Same production in 1938 reported for Bergmannssegen and Friedrichshall.
[3]No production in 1938.
[4]Expected to commence production in year ending June 30, 1950.
[5]Expected to commence production in year ending June 30, 1951.
[6]Expected to commence production in year ending June 30, 1949.

Plan. Also, potash is the only one which under the provisions of the plan it will be possible for the Bizone to produce in excess of her own requirements. As there is a good export market for potash and the prospect is that this will continue, rapid expansion of the Bizonal production to provide an export surplus of potash would seem to be highly desirable.

Mixed Fertilizer

The term "mixed fertilizer" relates to products ordinarily prepared by simply mixing together the component fertilizer materials, usually in the dry way. In contrast to the compound fertilizers discussed in a preceding section, the individual particles of the mixtures are not chemically homogeneous. Superphosphate is practically the only source of P_2O_5 in the German mixtures, which range in total plant-food content from about 18 to 29 per cent, while ammonium sulfate and potassium chloride are the principal carriers of nitrogen and potash, respectively. The proportion of the total plant food consumed as mixed fertilizer in Germany is quite small. Although complete data are not available, it appears that prior to the war less than 10 per cent of the annual total consumption of P_2O_5 (about one-third of the consumption of superphosphate) was used in this manner, as compared with more than 50 per cent in the United States. During the war the proportion was much smaller, owing to the great decrease in the German production of superphosphate. Subsequently, manufacture of mixed fertilizer in the Bizone has been restricted to mixtures for use on home gardens, because of the shortage of fertilizer materials. This restriction will be modified as the supply of materials improves. Production of mixed fertilizer is confined mostly to plants that also make superphosphate, and the consumption of mixtures is largely in the British part of the Bizone.

Fertilizer in the French Zone

The fertilizer situation in the French Zone[7] is of interest to the Bizone, principally because of the large nitrogen plant at Oppau. The French Zone can contribute very substantial quantities of nitrogen fertilizer to the Bizone's inadequate supply, but the French Zone's production of potash and especially of phosphate is considerably below the Zone's requirements. The Saar produces some byproduct ammonia and a large quantity of basic slag (about 54,000 tons of P_2O_5 in 1938–1939) but no potash. Consumption of plant food in the French Zone and in the Saar in the fertilizer year 1938-1939 was approximately as follows:

	Tons N	Tons P_2O_5	Tons K_2O
French Zone.....	40,000	58,000	75,000
Saar.....	3,600	3,400	4,500

The plant-food requirements of the French Zone for the fiscal years 1948–1949 to 1950-1951 are said to exceed the 1938–1939 consumption by substantial margins.

The only two nitrogen plants in the French Zone are the synthetic ammonia plant of I. G. Farbenindustrie A. G., Oppau, and the cyanamide plant (*15*) of Lonza-Werke Elektrochemische Fabrik G. m. b. H., Waldshut, Baden. A third plant, Electro-Nitrum A. G., Rhina, Baden, using the arc process and having an annual capacity of 600 to 700 tons of nitrogen, is reported to have been in operation before the war, but its subsequent fate is not known to the writers. The cyanamide plant, with a prewar capacity of 15,000 tons of nitrogen annually, is said to have escaped damage but is now engaged in manufacture of other products.

I. G. Farbenindustrie, Hochst, Hessen. Nitric Acid Absorption Towers in Center Background. April, 1948

The present program for nitrogen production in the French Zone centers entirely, or nearly so, around the Oppau synthetic ammonia plant which, before war damage, was the second largest facility of its kind in Germany. Its nitrogen-fixing capacity was exceeded only by that of the Leuna plant near Merseburg, Soviet Zone. According to Gregory and Fogler (*25*), the prewar capacity of the Oppau plant was about 180,000 tons of nitrogen (as primary ammonia) per year. During the war the capacity was in-

(Continued on page 24)

[7]The term French Zone, as used in this paper, does not include the Saar.

World Nitrogen Allocation to End on June 30th

On June 30, 1949, the allocation of nitrogen fertilizer materials among the nations of the world will be discontinued. This decision was reached at a meeting of the International Emergency Food Committee held in Washington on April 19th. The recommendation for this action had been made by the sub-committee on fertilizers. The present nitrogen allocations will continue until June 30th.

It is estimated that the world production of nitrogenous fertilizers during the 1949–1950 fertilizer year will total 3,770,000 metric tons of nitrogen, an increase of about 20 per cent over the 1948–1949 output of 3,160,000 tons. For all practical purposes this should provide an adequate supply for current needs, taking into account the ability of the various countries to make purchases of these materials.

Army Asks for Sulphate of Ammonia Bids

The Ordnance Department of the Army has asked for bids on the furnishing of 80,000 tons of sulphate of ammonia, to be made from anhydrous ammonia furnished by the government. The bids will be opened on May 10th at the Joliet Arsenal, Joliet, Ill.

The specifications call for a fertilizer grade of sulphate of ammonia in good mechanical condition and analyzing not less than 21 per cent nitrogen. Deliveries are to be made in approximately equal quantities during the months of July, August and September, 1949, at ports to be specified. The anhydrous ammonia will be supplied from Army ordnance plants at Morgantown, W. Va.; Etter, Tex., and Houston, Tex Manufacturers may bid on the entire 80,000 tons or on any portion amounting to 10,000 tons or over

Coke Oven Ammonia Research Bureau Increases Staff

The Coke Oven Ammonia Research Bureau, Inc., has announced the addition of Murry C. McJunkin to their staff as Northeastern Agronomist as of April 1, 1949. He is a graduate of Pennsylvania State College, receiving his degree in Agricultural Education in 1940. Mr. McJunkin then taught Vocational Agriculture in high schools in Pennsylvania until he returned to Penn State in February, 1946, for advanced study and research in the Department of Agricultural Education.

While at Penn State Mr. McJunkin conducted some unique studies in teaching methods and has completed research requirements for his Doctorate Degree. In this research work Mr. McJunkin has arranged for and supervised numerous fertilizer demonstrations throughout the state. These demonstrations were projects of vocational agricultural students and G. I. trainees. These demonstrations stressed the importance of a balanced program in corn production including fertilization, rate of planting, hybrids, cultivation and crop rotation. This, of course, has created much interest throughout the state in higher yields and better production methods for corn, a most important crop in the State of Pennsylvania.

Warren C. Huff, formerly Agronomist in the Northeastern states has been transferred to the Mid-Western states where he will continue his work with the bureau.

Lion Oil Plans New Chemical Plants

At the annual meeting of stockholders of the Lion Oil Company, held on April 12th, T. H. Barton, chairman of the board of directors, announced that new plants for the production of sulphuric acid and of sulphate of ammonia would be completed during the third quarter of 1949. The sulphate of ammonia plant will have a capacity of 380 tons per day.

Mr. Barton also reported that the production of anhydrous ammonia is being increased, so that by July 1st the daily output will be 570 tons, compared with present production of 440 tons per day. At the same time, additional prilling facilities for the production of ammonium nitrate will go into operation.

Change in Phosphate Land Leasing Requirements

In the regulations on the leasing of phosphate lands, recently issued by the Bureau of Land Management, Department of the Interior, it was required that corporations acquiring such leases report the names and addresses of all their alien stockholders. As individuals, aliens may not acquire or hold interest in such leases.

The Secretary of the Interior has recently changed these requirements, making the reporting of alien stockholders necessary only if more than 10 per cent of the voting stock or all the stock of a particular class is owned or controlled by aliens.

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Experts Discuss Connecticut Soils and Fertilizers

Soils and agronomy staffs of the Connecticut Agricultural Experiment Station, the University of Connecticut, and Soil Conservation Service men stationed in the State reported on results of their recent work at a meeting held on April 12th at the Experiment Station's Tobacco Laboratory at Windsor. Some 50 soil scientists, extension specialists, foresters and commercial men attended the meeting. New techniques in soil science, the relative merits of various fertilizer materials, methods of cultivation, and culture and fertilization of specific crops were among the subjects covered.

Reporting on recent potato fertilizer trials, Dr. Arthur Hawkins, University of Connecticut, suggested that a 6–8–8 grade fertilizer seemed more efficient than the more commonly used grade for potatoes, 5–8–7. Dr. Hawkins, B. A. Brown and Dr. E. J. Rubins, all of the University of Connecticut, discussed "problem" potato soils. Many soils, they said, which do not respond to usual fertilization practices, are improved by lime applications. Care must be taken, though, they pointed out, not to raise the soil *p*H so much that conditions become favorable to potato scab. According to Dr. C. L. W. Swanson, of the Experiment Station, the Soils Department there will initiate experiments this summer to determine the effect on soil structure of lime and fertilizer applications to this type of soil.

On Corn, H. G. M. Jacobson of the Experiment Station reported on the danger of lowering organic matter by intensive cropping, thus reducing yields. His experiments, he said, have shown that annual applications to soils of native organic materials resulted in the largest residues of organic matter, with dried manure rating next best. Soils treated with ground tobacco stems and dried sheep manure showed losses in organic matter content at the end of the tests.

Fertilizers for forage crops, and the use of poultry manure as a fertilizer were discussed by J. S. Owens, and Stanley Papanos, respectively. Both men are on the University of Connecticut staff.

A report on the annual National Soil Survey Conference, held last month at Memphis, Tenn., was given by Dr. Swanson, who attended as official representative from the Eastern region. It was brought out at the conference, he stated, that soil is never ruined or destroyed, as is commonly believed, al-

though it may be severely damaged in the cause of crop production. Some soils, he said, especially those that are level and heavy textured, are actually benefited by natural erosion.

Dr. Swanson also discussed experiments at the Connecticut Station, concerning weed control methods and their effect on soil. Thus far, he said, weed control by cultivation has resulted in higher yields of the test crop, corn, than chemical treatments.

The relative merits of plowing vs. harrowing as far as soil conditions are concerned, were discussed by T. R. Swanback of the Tobacco Laboratory, who has been conducting experiments on this problem. The soil used in the test was Merrimac sandy loam. Thus far, he said, there are indications that the organic matter content is building up more rapidly in the harrowed soil.

The merits and disadvantages of "quick" soil testing were discussed by Allan King, University of Connecticut; Dr. H. A. Lunt, Connecticut Station, and Mr. Swanback. Technical problems of mapping agricultural and forest soils were described by Lewis Ilgen, Soil Conservation Service, and Dr. Lunt, respectively. The use of the Connecticut Station's new spectrometer in revealing the quality and quantity of minerals in soils was explained by Dr. G. A. Bourbeau. Types of soil found in New Jersey were described for the Connecticut scientists by G. A. Quakenbush of the Soil Conservation Service.

Change of Address

On April 25th the publication offices of THE AMERICAN FERTILIZER were moved to new quarters at 137 North Broad Street, Philadelphia 7, Pa. Our telephone is now MArket 7–3405. Both editorial and advertising departments are located at the above address.

Bryant Appointed Quaker Oats Southeast Representative

The Quaker Oats Company has announced the appointment of Jack H. Bryant of Winder, Ga., as sales representative in the Southeast for FUR-AG, furfural residue used in making fertilizers.

Mr. Bryant will represent the company's chemicals department in Georgia and neighboring states. His headquarters will be the Atlanta sales office of The Quaker Oats Company, which extracts furfural from farm byproducts. Furfural is a basic ingredient in such commodities as plastics, nylon, lubricants and solvents.

N. F. A. Convention Recreation Committees Announced

The officers and convention committee of the National Fertilizer Association has announced the appointment of the following committees to take charge of the recreational features at the coming annual June convention of the association, to be held at the Greenbrier, White Sulphur Springs, W. Va., on June 13th, 14th and 15th:

Men's Golf Events. A. L. Walker, Jr., *chairman*; B. A. Crady, Morton S. Hodgson, Tom L. Jones, John W. Rutland, H. B. Siems.

Tennis. James C. Totman, *chairman*; James E. Cope, Chas. F. Martin, Mrs. Garland D. Glover.

Horseshoe Pitching Contest. A. A. Schultz, *chairman*; C. R. Martin, H. A. Parker.

Ladies' Golf Events. Mrs. J. E. Totman, *chairman*; Mrs. E. M. Kolb, Mrs. Roy S. Marsden, Mrs. J. P. Brinton, Jr., Mrs. Frank R. Dulany.

Bridge Committee. Mrs. Burton A. Ford, *chairman*; Mrs. R. D. Martenet, Mrs. Weller Noble, Mrs. R. A. Oliphant, Mrs. W. S. Tyler.

Leon Davis Joins Southern Agricultural Fertilizer Co.

Leon H Davis was recently elected vice-president of Southern Agricultural Fertilizer Company, manufacturers of Safco Brand fertilizers, at Clarksdale, Miss He was for many years connected with the fertilizer department of the Southern Cotton Oil Co. and more recently was vice-president and manager of Blytheville Fertilizer Corporation, Blytheville, Ark

Mr. Davis has always taken an active interest in industry affairs and has served on the board of directors of the National Fertilizer Association. His many friends in the fertilizer trade wish him all success in his new connection.

New Mexico Tonnage Increases

Sales of fertilizers in New Mexico during the year 1948 totaled 12,950 tons, an increase of 39 per cent over 1948 sales, according to figures issued by the New Mexico Fertilizer Control Office. Of the total consumption, 4,362 tons was mixed fertilizer, the leading grade being 16–20–0 with 3,024 tons. Superphosphates of varying grades accounted for 6,821 tons and the balance was comprised of 950 tons of chemical nitrogen salts, chiefly sulphate of ammonia and ammonium nitrate.

March Tag Sales at All-Time High

Fertilizer tax tag sales reached an all-time record for a single month during March. Figures received by The National Fertilizer Association from control officials in the 14 states which require the use of the tags reveal that last month's sales represent the equivalent of 1,922,000 short tons of fertilizer. Combined with January sales and the 12-year monthly sales peak reached in February, the March totals brought sales for the first quarter of 1949 to 4,680,000 tons, far surpassing the comparable total for any previous year, despite a slow start in January when sales dropped below corresponding figures for earlier years.

The tonnage represented by last month's tag sales was approximately one-third higher than that of the same month last year and 82 per cent greater than that of two years ago. Sales in March, as percentages of yearly totals, have been declining during the past several years as the result of changes in the seasonal distribution of sales. Thus, in 1935 March sales represented about 34 per cent of the year's total; by 1940 this figure had dropped to 30 per cent, and in 1948 to 16 per cent of total sales for the year. A similar trend, though not nearly so marked, has been noted for first quarter sales; in 1936 January–March sales accounted for 59 per cent of total sales for the year, while in 1948 only 43 per cent of the tags were sold during the first three months.

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FERTILIZER TAX TAG SALES
Compiled by The National Fertilizer Association
(All Aggregates in Short Tons)

	March			January–March			
				1949			
State	1949	1948	1947	Total	% of '48	1948	1947
Virginia	141,575	131,847	95,780	340,025	114	298,512	261,130
North Carolina	333,876	321,290	210,008	957,822	119	802,176	791,730
South Carolina	246,566	146,385	120,765	617,600	122	507,316	445,930
Georgia	380,792	242,605	216,103	747,288	114	658,316	631,493
Florida	88,699	99,328	56,325	329,272	115	285,171	224,261
Alabama	193,824	150,262	100,250	441,900	100	441,040	387,600
Tennessee	60,803	47,237	47,832	123,698	111	111,109	125,872
Arkansas	50,064	23,102	29,200	116,674	206	56,638	94,000
Texas	106,513	73,912	40,405	197,656	169	166,985	139,244
Oklahoma	26,800	16,027	9,840	54,700	97	56,189	35,740
Total South	1,629,512	1,251,995	926,508	3,926,635	116	3,383,452	3,137,000
Indiana	97,221	62,955	47,993	230,914	104	222,763	175,107
Kentucky	71,468	66,317	44,478	252,203	120	211,048	160,731
Missouri	98,886	54,020	36,407	215,192	134	160,083	99,427
Kansas	24,752	4,665	300	54,931	171	32,205	19,898
Total Midwest	292,327	187,957	129,178	753,240	120	626,099	455,163
Grand Total	1,921,839	1,439,952	1,055,686	4,679,875	117	4,009,551	3,592,163

FERTILIZER MATERIALS MARKET

NEW YORK

Little Change in Market for Chemical Nitrogen. Supply Still Short. Organic Materials Showed Steady Price Level in General. Record Price for Spot Fish Meal. Bone Meal Very Scarce. Superphosphate Supply Seems Adequate. No Change in Potash Prices to Date

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, April 27, 1949.

Sulphate of Ammonia

Demand for sulphate of ammonia continued good from various sections and producers were shipping on old contracts with no new price schedules announced as yet for the coming season.

Nitrate of Soda

Supplies were better due to the increased domestic production and a more even supply situation is looked for. Several large arrivals of Chilean material helped the situation along and most buyers were able to secure necessary supplies.

Ammonium Nitrate

No price changes were noted and demand continued excellent particularly from the South. Shipping schedules are being maintained fairly well by all producers and no further strikes have been reported.

Nitrogenous Tankage

No price changes were reported and the supply seemed heavy enough to take care of the demand although some producers were sold ahead.

Castor Pomace

Production of this material is limited as the producers are not working at capacity and still slower production is looked for in the near future. No material was offered either for prompt or future positions.

Organics

The organic fertilizer materials market was little changed pricewise. Most manufacturers were finishing up their mixing season. Blood and tankage held at steady prices of $8.00 per unit of ammonia ($9.72 per unit N), f.o.b. various shipping points, with most of the sales being made to the feed trade and fertilizer people buying very little. Soybean meal held at around $60.00 per ton, f.o.b. Decatur, Ill., and cottonseed meal held at around $56.00 per ton, Memphis basis. Linseed meal was in slow demand.

Fish Meal

While no new sales were reported for the summer catch of fish, spot fish meal sold to the feed trade as high as $3.50 per unit of protein, which seemed to be a record price. Available stocks were very light. It is thought as soon as the new production gets under way in about three weeks, spot prices will come down.

Bone Meal

Bone meal is one fertilizer material that is most difficult to buy and the production is very limited. Most buyers have not been able to obtain necessary supplies this season and a shortage is looked for for some time ahead.

Hoof Meal

Little material was offered, with last sales on basis of $7.00 per unit of ammonia ($8.51 per unit N), f.o.b. shipping points. Some South American material was available at around this figure.

Superphosphate

No shortages were reported in this material and the supply seems heavy enough to fill all buyers' requirements for this season. Triple superphosphate was in slightly better supply and situation was not as acute as this time last year.

Potash

One large producer has announced price schedules for the coming fertilizer year at the

same basis as the past year. Little change is looked for when other producers announce their prices. It is thought the supply situation is better at this time than a year ago, and by summer most manufacturers will be able to secure what they need to fill their entire requirements.

PHILADELPHIA

Demand for Mixed Fertilizer Improving. Demand for Nitrogen Materials Still Great. No Change in Muriate of Potash Price

Exclusive Correspondence to "The American Fertilizer"

PHILADELPHIA, April 25, 1949.

There has been a slightly increased call for chemical nitrogen and potash, but not at the high resale prices heretofore prevailing. The demand for mixed fertilizers is reported to have picked up materially, and in some sections sales during the first quarter of this year are considerably ahead of last.

Sulphate of Ammonia.—Contract requirements continue to take all stocks available, with decidedly little resale offered. The market position is tight and no easement in view.

Ammonium Nitrate.—Demand continues ahead of supply and shipments are reported considerably behind schedule. Production is mostly under contract.

Nitrate of Soda.—While imports continue on schedule and domestic distribution is greatly increased, the demand continues to keep up with the supply and market position remains tight.

Blood, Tankage, Bone.—Blood is a little easier with demand light. This is quoted at $8.00 per unit of ammonia ($9.72 per unit N). Tankage holds at the same price with demand limited. Bone meal is still no easier in supply and the main production is under contract. Hoof meal is practically without demand and is nominal at $7.00 per unit of ammonia ($8.51 per unit N).

Castor Pomace.—Production is said to be slowing down and is all under contract.

Fish Scrap.—Practically no menhaden is to be had for spot delivery, but there were offerings of imported meal as high as $245.00 per ton. Sixty per cent menhaden meal is quoted for May June at $170.00 per ton, and June July at $129.00, with scrap in the same position at $125.00.

Phosphate Rock.—Situation is reported tightening up in the face of good demand, and labor difficulties in some directions.

Superphosphate.—Movement is sufficiently active to prevent stock accumulation to any great extent, with fairly tight situation due to temporarily uncertain rock supply. No price changes reported.

Potash.—While production has increased, there has been no accumulation of stocks and demand continues strong. Some muriate prices for the season June 1, 1949 to May 31, 1950 have been announced—same as last season.

CHICAGO

No Change in Organic Market. Trading Confined to Spot Sales. Summer Price Decline Expected

Exclusive Correspondence to "The American Fertilizer"

CHICAGO, April 25, 1949.

There has been practically no change in the market on animal ammoniates in the Chicago territory. The demand is keeping pace pretty well with production and up to this time everyone seems to be satisfied with the present prices. Trading is still confined to nearby deliveries and the general impression is that, as we go into the pasture season, the demand for proteins may fall off and, consequently, prices will decline.

Meat scraps are quoted $112.50 to $115.00 per ton and digester tankage is quoted $105.00 to $112.50 according to location. Dry rendered tankage is moving steadily at $2.05 to $2.10 per unit of protein delivered in the

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Middle West. Dried blood last sold at $7.75 per unit of ammonia ($9.42 per unit N), delivered and dry rendered tankage is quoted $8.00 to $8.25 ($9.72 to $10.02 per unit N). Steamed bone meal 65 per cent is $75.00 per ton, bagged, and raw bone meal 4½–45 is $65.00 per ton.

CHARLESTON

Fertilizer Shipments About Completed. Heavier Demand for Phosphate Rock. Chemical Nitrogen Sold Up Through June

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, April 25, 1949.

The movement of fertilizers to farms is practically over for this season in the Southeast with only spotty demand in certain sections. Potash demand continues strong and supplies of nitrogen remain tight. Superphosphate in general appears to be sufficient with shortages only in certain areas.

Organics.—Slight interest is shown in prompt shipment organics for the fertilizer trade. Considerable quantities of summer shipment organics have been sold, with producers refraining from offering fall and spring shipment as yet. Prompt nitrogenous tankage is selling at $3.00 to $4.00 per unit of ammonia ($3.64 to $4.86 per unit N), in bulk, f.o.b. production points.

Castor Pomace.—The market is nominally $20.00 per ton in bags, f.o.b. Northeastern shipping points, with producers sold up for prompt and summer shipment. Movement is against current contracts.

Dried Ground Blood.—The Chicago market lists dried ground blood at $7.75 per unit of ammonia ($9.42 per unit N), in bulk, with the New York market trying to get $8.25 per unit ammonia ($10.02 per unit N), but sales being made at $8.00 ($9.72 per unit N).

Potash.—Supplies are readily being absorbed as produced and interest in future shipments is strong. One producer of domestic potash has announced prices with no change from the 1948–49 season prices.

Phosphate Rock.—Supply conditions have tightened because of increased demand for home and export and because of labor troubles at one of the mines.

Superphosphate.—Superphosphate continues short in certain areas of the Midwest and Southeast and demand is at a high level. Prices are steady.

Sulphate of Ammonia.—Production of coke-oven sulphate of ammonia is reported heavily sold through June. The market continues tight and prices firm.

Ammonium Nitrate.—There has been no easement in buying conditions and the Canadian output is sold through the first half of June. Demand for domestic material continues high.

Meyer Appointed Chief Agronomist of Federal Chemical Co.

Dr. Theodore A. Meyer has recently joined Federal Chemical Company as head of its Agronomy Department. With Federal he will work closely with the sales personnel and keep it abreast of agronomic developments at the various Experiment Stations of the states served by Federal Chemical.

Dr. Meyer is a native of Cullman, Ala., where he attended elementary and high schools. After graduation from the University of Alabama he worked as industrial production chemist in St. Louis. Agricultural Science still called, however, and he went to Alabama Polytechnic Institute at Auburn, receiving his M.S. degree in Soils in 1942. By this time war production was getting into full swing and Meyer served as research chemist on a T.V.A. joint project at the University of

Tennessee. His work there dealt with nitrogenous and phosphatic materials. From there he enlisted in the Navy and saw long service aboard an L.S.T. in the Pacific.

After discharge in 1946, Meyer went to Ohio State University on a research fellowship to continue post-graduate work. Ohio State conferred on him the degree of Doctor of Philosophy in Agronomy. With Mrs. Meyer and their baby daughter, Dr. Meyer now lives in Louisville.

Federal Chemical Company operates fertilizer plants in Louisville, Ky.; Columbus, Ohio; Nashville and Humboldt, Tenn., and Meridian, Miss. Its phosphate rock mines are near Mt. Pleasant, Tenn., and its general office is in the Starks Building, Louisville.

Steel-Strap-and-Paper Strips Prevent Car Doorway Damage

When boxcars are loaded solid across the doors with cartons, boxes, bags, bales, or bundles, shippers usually find it necessary to barricade car doorways in some manner to prevent the load from becoming lodged in the car doorways enroute. Unless some kind of barricade is erected across door openings, the lading invariably shifts outward against the car doors, making the doors difficult to open.

Prying or pulling car doors open when lading is lodged against the doors frequently causes damage to the load and results in loss claims and adjustment problems between the shipper and receiver.

To avoid this common and irksome source of trouble, many shippers are obliged to erect costly, complex, cumbersome, and difficult-to-install car-door barricades. Each shipper has had to devise methods to suit his own specific needs and such special barricades are often hard to install; require the services of high-priced mechanics; and sometimes add considerable dunnage weight to the expenses of shipping.

The Signode Steel Strapping Company of Chicago, Illinois, has developed a successful type of steel-strap-and-kraft-paper car door retaining strip that is now proving its economy, practicability, and soundness in the daily shipping operations of a wide range of industries.

This inexpensive, but efficient barricade uses no lumber. Made of strips of three-quarter inch by .020 Signode steel strapping with nail holes punched, and heavy, water-repellent kraft paper, these new retaining strips are nailed through the steel strappings across the door opening inside the car. Depending upon the characteristics and weight of the load, the strips may be butted, overlapped,

Signode Box Car Strip

or spaced for maximum protective efficiency. Light in weight, the average dunnage for a boxcar with Signode strips will run only a few pounds.

Signode strips are now made in two sizes: 18 inches high by 84 inches wide for boxcars with 6-foot doors; and 18 inches by 108 inches wide for boxcars with extra wide doors with steel door jambs. Experience shows that these two sizes ideally meet the needs of nearly any type lading. This retaining strip puts

an end to damage from snagging and ripping on sharp edges, splinters, corners, and protruding nails. Lading cannot become lodged against car doors, and it is no longer necessary to "knock in" a doorway barrier, as unloaders need only snip the steel bands on the retaining strips. Damage to containers piled near the doorway is effectively avoided.

A prime advantage of those new strips is the ease with which they can be applied, and the simplicity of disposal. Installation requires no special skill. Application is quick and easy with ordinary hammer and 8d nails. The strips come ready for immediate application—no cutting or fitting is necessary. Further information can be obtained from the Signode Steel Strapping Co., 2600 N. Western Ave., Chicago 47, Ill.

Commercial Fertilizers Better for Asparagus

Asparagus yields are increased more by commercial fertilizers than by manure or chopped-up hay, according to two cooperating specialists in horticulture and soils at the Irrigation Experiment Station, Prosser, Washington, Dr. Walter J. Clore, associate horticulturist, and Dr. C. O. Stanberry, assistant agronomist.

The reason is that the commercial fertilizers can supply enough nitrogen to break down the disked-in tops of asparagus and leave a surplus for the use of the growing crop. Sufficient quantities of manure and hay will furnish just as much nitrogen but much of it must go to break down the organic matter added by themselves. This organic matter and the asparagus tops used up too much nitrogen to leave enough for the crop.

In their experiments Drs. Clore and Stanberry added enough of each kind of fertilizer to supply 200 pounds of actual nitrogen per acre. To do this required 20 tons of manure or four tons of chopped hay.

Corn Responds to High Phosphate Fertilizer

High concentrated phosphate fertilizers have increased corn yields more than regular superphosphate, in continuing tests at Iowa State College.

Experiments were with regular superphosphate (0-20-0), triple superphosphate (0-43-0), and calcium metaphosphate (0-62-0). The tests were started in 1937 and have been run through four complete rotations.

Corn which had received no treatment yielded 86.7 bushels per acre, fields treated with 0-20-0 yielded 88.7 bushels, those treated with 0-43-0 yielded 89.5 bushels per acre, and the highest yield recorded was 90.3 bushels per acre on fields treated with 0-62-0.

A. J. Englehorn, agronomist in charge of the tests, said that the experiments were made with a corn-oats-hay rotation. He said that the tests indicate a trend but that the responses are not large enough to be considered significant.

More experiments will be run on the use of concentrated fertilizers.

Early Vegetables Need Nitrogen

Use of nitrogen fertilizer as a side-dressing for early vegetable crops is a standard practice in Arkansas, advises Extension Horticulturist Earl J. Allen, of Fayetteville, Ark.

This is particularly true for the leafy vegetable crops such as spinach or other greens and cabbage. Leafy crops should be grown as rapidly as possible. A check in growth usually means poorer quality produce and smaller yields.

Lack of nitrogen during cool wet spells of spring is one reason for slow growth, Mr. Allen explains. By applying nitrogen at the rate of 15 pounds per acre, producers can encourage continued rapid growth. This amount of nitrogen can be obtained from about 100 pounds of nitrate of soda or 50 pounds of ammonium nitrate.

Unless very large quantities of mixed fertilizer or large applications of manure were made before planting time, side-dressing Irish potatoes will pay, especially in a cold wet season. Every effort should be made to get a fairly large early top growth of potatoes, so they can start maturing before hot weather sets in. Side-dressing with 15 pounds or more of nitrogen will hasten vine growth, increase

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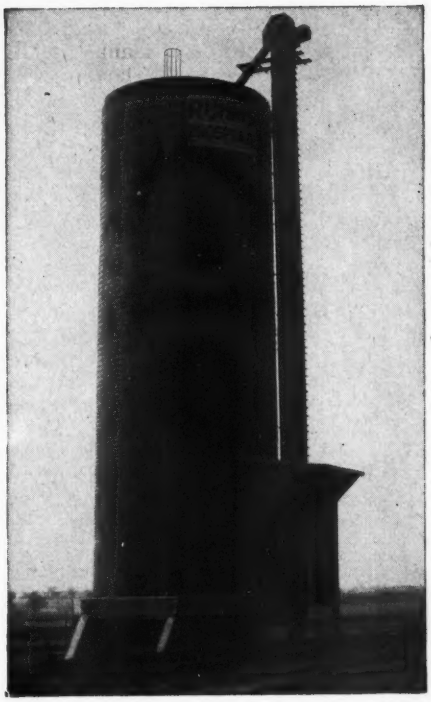

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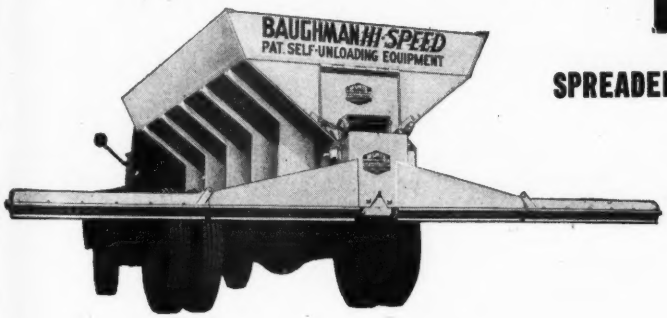

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yields and give the plant a chance to start setting potatoes earlier.

The need for extra nitrogen is shown if the plants seem stunted and pale, or if growth is very slow even though the soil contains an adequate amount of moisture.

MARCH TAG SALES

(Continued from page 14)

With the exception of Florida, each of the reporting states sold more tags last month than during the same month a year ago. For the first quarter of the year, increases over 1948 equivalent tonnages were reported in all states except Oklahoma, where sales were off by a small amount. The largest percentage increase in first quarter sales took place in Arkansas which more than doubled its 1948 figure. The largest gain in tonnage was that shown for North Carolina which bettered last year's first quarter total by more than 155,000 tons.

As a group, the Southern states sold tags covering 3.9 million tons, or 84 per cent of the aggregate for all reporting states. This is about the same as the 1948 figure but is approximately 3 per cent below the comparable 1947 figure.

In 1947, about 58 per cent of the fertilizer output was used in the states which report monthly sales of tax tags.

FERTILIZER PROGRESS IN BIZONAL GERMANY

(Continued from page 10)

creased, and before the plant was damaged it was capable of producing about 270,000 tons of nitrogen. At the same time the capacity of the facilities for manufacture of ammonia-fixation products (ammonium sulfate, ammonium chloride, ammonium bicarbonate, ammonium nitrate-calcium carbonate mixture, sodium nitrate, calcium nitrate, and urea) was 154,200 tons of nitrogen per year, plus an additional capacity (estimated to have been more than 10,000 tons of nitrogen) for production of Nitrophoska. The plant was heavily damaged during the war. As of August, 1945, its operable capacity for primary ammonia, without limitation as to coal, is reported to have been only about 25 per cent of the capacity before damage (*25*). Likewise, the ammonia fixing capacity was less than 20 per cent of its former level. The damage included destruction of the wet-process plant for manufacture of phosphoric acid by the Dorr method and about 30 per cent destruction of the plant for producing ammonium sulfate by the ammonium carbonate-calcium sulfate reaction (*12*); neither of these facilities is scheduled for reconstruction in the near future. The ammonia and fertilizer plants were not involved in the disastrous explosion that occurred in the adjoining Ludwigshafen works on July 28, 1948. The disposition of the ammonia produced at Oppau during the latter part of the war was as follows (*90*):

	Tons N		
	1943	1944	Jan.-March 1945
Converted at Oppau	113,820	46,810	0
Shipped as ammonia	110,000	90,340	2,890
Total	223,820	137,150	2,890

Estimates of the possible maximum output of primary ammonia and its fixation products at Oppau, as of January 1, 1948 and several subsequent dates, are given in

TABLE IX. ESTIMATED POSSIBLE MAXIMUM PRODUCTION OF PRIMARY AMMONIA AND ITS CONVERSION PRODUCTS AT OPPAU

Distribution of Production	Tons of Nitrogen[1] Jan. 1, 1948	Jan. 1, 1949	Later
Primary ammonia[2]	127,750	149,650	149,650
Fertilizers	54,385	70,080	108,405
Technical products	25,550	29,200	29,200
Total	79,935	99,280	137,605
Conversion loss	.8,030	9,855	12,045
Primary ammonia Utilized	87,965	109,135	149,650
Surplus of primary ammonia	39,785	40,515	.....

[1]Annual basis, 365-day operation.
[2]Based on use of Ruhr coal. With Saar coal the production would be lower.

Table IX. On the basis of these figures, operation of the primary ammonia plant at the highest possible level would necessitate, at least for the immediate future, shipment of large quantities of ammonia from Oppau to other locations for conversion into finished fertilizers. In January-March, 1948 the production of primary ammonia at Oppau was at the rate of about 67,000 tons of nitrogen per year. The rate was as high as 102,000 tons in certain periods of the preceding six months. Currently, sodium nitrate (produced in connection with clean-up of tail gases in nitric acid manufacture), Nitrophoska, and chiefly ammonium nitrate-calcium carbonate mixture are the only fertilizers made at Oppau. Urea (*17*, *23*) is also produced but is used entirely for nonfertilizer purposes. Production of calcium nitrate and ammonium sulfate is proposed for the future — some time after 1948.

Phosphate fertilizer facilities in the French Zone comprise two superphosphate plants located at Ludwigshafen-Mundenheim and Hönningen, respectively, and the Nitrophoska plant at Oppau. The two superphosphate plants had a prewar total capacity of 12,900 tons of P_2O_5 annually, The Ludwigshafen-Mundenheim plant (*67*) suffered about 25 per cent damage during the war. Its present condition and that of the Hönningen plant is not known to the writers. The present capacity for production of P_2O_5 at Oppau is reported to be about 9,000 tons annually and expansion to about 16,000 tons is planned.

The only potash mine in the French Zone is located at Buggingen, Baden, just south of Freiburg (*52*, *89*). The prewar productive capacity of this mine is said to have been some 65,000 tons of K_2O annually. The 1947–1948 output of 24,000 tons is expected to be doubled in 1948–1949 and to be increased to about 70,000 tons in 1950–1951.

Nitrogen at Linz, Austria

The synthetic ammonia plant at Linz, Austria (*76*), which now operates under the name of Österreichische Stickstoffwerke A. G., is important to the Bizone as a source of nitrogen fertilizer. Through a processing arrangement involving Ruhr coal the Bizone received some 20,000 tons of nitrogen (as ammonium nitrate-calcium carbonate mixture) from Linz in the year ending June 30, 1948. The same quantity will be obtained under a similar arrangement in 1948–1949.

The plant, which commenced ammonia production in October, 1942 and was heavily bombed in January, 1945, is now in generally good repair. It was originally planned for an annual capacity of 50,000 tons of nitrogen as primary ammonia. Steps to increase the capacity to 100,000 tons were taken in 1943 and some progress was made before the end of the year. The present capacity of 60,000 tons is expected to be increased to 120,000 tons by 1950–1951. The production in 1943 to 1947 was as follows:

Calendar Year:	1943	1944	1945	1946	1947
Nitrogen, tons:	44,900	54,600	Very small	7,400	25,400

A production of 220,000 tons of ammonium nitrate calcium carbonate mixture (20.5% N) is planned for 1948–1949, of which 120,000 tons is said to be needed for Austrian agriculture. In addition, the plant will produce for technical and industrial purposes about 700 tons of nitrogen as ammonia, nitric acid, and nitrogen salts. Nearly all the primary ammonia will continue, however, to be converted into ammonium nitrate-calcium carbonate mixture for fertilizer use, and the capacity for production of this material will be expanded simultaneously with that for primary ammonia.

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Commercial Solvents Corp., New York City
Spencer Chemical Co., Kansas City, Mo.

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Woodward & Dickerson, Inc., Philadelphia, Pa.

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American Potash and Chem. Corp., New York City

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McIver & Son, Alex. M., Charleston, S. C.
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Hayward Company, The, New York City

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Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill
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McIver & Son, Alex. M., Charleston, S. C.
Pittsburgh Agricultural Chemical Co. Pittsburgh, Pa.
Spencer Chemical Co., Kansas City, Mo.
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Shuey & Company, Inc., Savannah, Ga.
Wiley & Company, Baltimore, Md.

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Jackle, Frank R., New York City
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Quaker Oats Company, Chicago, Ill.

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Southern Lead Burning Co., Atlanta, Ga.

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American Agricultural Chemical Co., New York City
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McIver & Son, Alex. M., Charleston, S. C.
National Lime & Stone Co., Findlay, Ohio

LOADERS—Car and Wagon
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Atlanta Utility Works, The, East Point, Ga.
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Sackett & Sons Co., The A. J., Baltimore, Md.
Sturtevant Mill Company, Boston, Mass.

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Atlanta Utility Works, The, East Point, Ga.
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Atlanta Utility Works, The, East Point, Ga.
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MACHINERY—Superphosphate Manufacturing
Atlanta Utility Works, The, East Point, Ga.
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International Minerals & Chemical Corporation, Chicago, Ill.
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Schmutz Mfg. Co., Louisville, Ky.

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Virginia-Carolina Chemical Corp., Richmond, Va.

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Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
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Huber & Company, New York City
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Virginia-Carolina Chemical Corp., Richmond, Va.

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International Minerals & Chemical Corporation, Chicago, Ill.
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Davidson Commission Co., The, Chicago, Ill.
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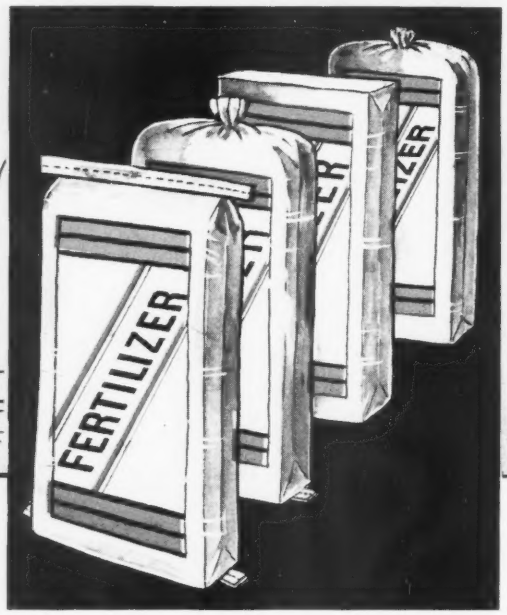

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Ashcraft-Wilkinson Co., Atlanta, Ga.
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Huber & Company, New York City
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Jackle, Frank R., New York City
Southern States Phosphate Fertilizer Co., Savannah, Ga.
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Virginia-Carolina Chemical Corp., Richmond, Va.

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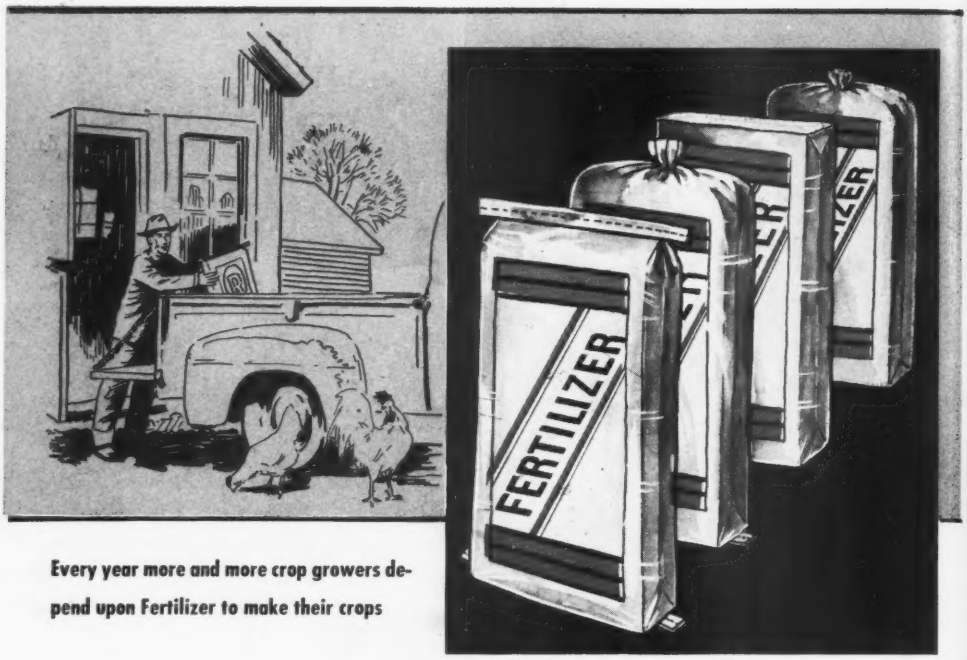

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